

Par'd PCT/ 01 FEB 2005 21

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number
WO 2004/015486 A1

(51) International Patent Classification⁷: G02F 1/1335

(21) International Application Number:
PCT/IB2003/003178

(22) International Filing Date: 22 July 2003 (22.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
02078172.0 2 August 2002 (02.08.2002) EP

(71) Applicant (for all designated States except US): KONIN-
KLIJKE PHILIPS ELECTRONICS N.V. [NL/NL];
Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): DOORNKAMP,
Ciska [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA
Eindhoven (NL).

(74) Agent: RAAP, Adriaan, Y.; Philips Intellectual Property
& Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven
(NL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

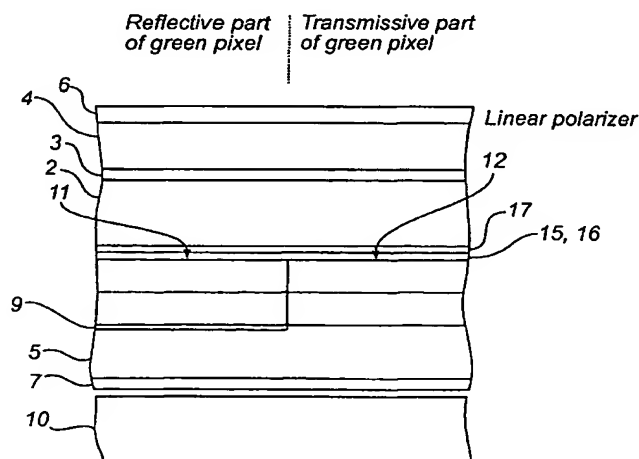
(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted
a patent (Rule 4.17(ii)) for the following designations AE,
AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES,
FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH,
PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN,
TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO

[Continued on next page]

(54) Title: TRANSFLECTIVE LIQUID CRYSTAL DISPLAY DEVICE



(57) Abstract: This invention relates to a transreflective liquid crystal display device, having a plurality of pixels (1), each comprising a liquid crystal layer (2) being sandwiched between a front and a back substrate (4, 5), a back light (10), a semi-transparent reflective element (7), being arranged between the back substrate (5) and the back light (5), a front polariser (6), and a driving arrangement (3) for controlling optical properties of the liquid crystal layer (2), whereby the pixel is subdivided into a reflective pixel part (1a) and a transmissive pixel part (1b). According to the invention, a cholesteric layer composition (11, 12) is arranged between said liquid crystal layer (2) and the back substrate (5), said cholesteric layer composition comprising; in said reflective pixel part (1a), a first cholesteric layer composition part (11) for reflecting a desired primary pixel colour, and in said transmissive pixel part (1b) a second cholesteric layer composition part (12) for reflecting the remaining primary colours, other than said desired primary pixel colour.

WO 2004/015486 A1



patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Patent Application No

PCT/IB 03/03178

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02F1/1335

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2001/020990 A1 (MOON JONG-WEON) 13 September 2001 (2001-09-13) abstract; figure 5 paragraphs '0046!-'0051! ---	1-10
A	US 5 841 494 A (HALL DENNIS R) 24 November 1998 (1998-11-24) column 2, line 66 -column 3, line 67 column 8, line 5 - line 34 figures 2,3,8 ---	1-10
A	EP 1 217 421 A (SEIKO EPSON CORP) 26 June 2002 (2002-06-26) paragraphs '0051!, '0056!-'0060!, '0222! figure 1 --- -/-	1-10

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "G" document member of the same patent family

Date of the actual completion of the international search

7 November 2003

Date of mailing of the international search report

17/11/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Hauser, M

INTERNATIONAL SEARCH REPORT

II
 International Application No
 PCT/IB 03/03178

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 08, 6 October 2000 (2000-10-06) & JP 2000 131684 A (TOSHIBA CORP), 12 May 2000 (2000-05-12) abstract -----	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 03/03178

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 2001020990	A1	13-09-2001	KR	2001068465 A	23-07-2001
US 5841494	A	24-11-1998	NONE		
EP 1217421	A	26-06-2002	JP	2003195296 A	09-07-2003
			CN	1360220 A	24-07-2002
			EP	1217421 A2	26-06-2002
			EP	1357421 A2	29-10-2003
			US	2002154257 A1	24-10-2002
			US	2003197189 A1	23-10-2003
JP 2000131684	A	12-05-2000	KR	2000029063 A	25-05-2000
			US	2002171794 A1	21-11-2002